

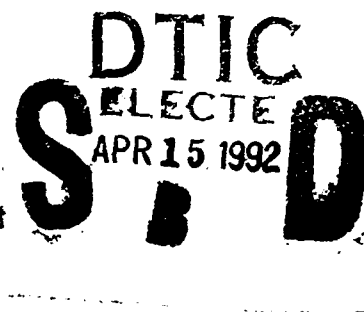
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PERFORMANCE ORIENTED PACKAGING TESTING
OF
WIREBOUND BOX
FOR
SMAW ROCKETS

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Performing Activity:
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Naval Surface Warfare Center
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FINAL

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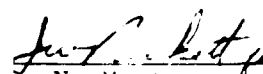
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| 13. ABSTRACT (Maximum 200 words) Qualification tests were performed to determine whether the MIL-B-46506 wirebound wood box containing six SMAW rockets meets the Performance Oriented Packaging requirements specified by the United Nations Recommendations on the Transport of Dangerous Goods. The container met the requirements when loaded to a gross weight of 71 kilograms. | | | | |
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INTRODUCTION

The packaging system for various Shoulder Mounted Assault Weapon (SMAW) encased rockets was tested to ascertain whether the container would meet the requirements of Performance Oriented Packaging (POP) as specified by the United Nations Recommendations on the Transport of Dangerous Goods Document, ST/SG/AC.10/1, Revision 6, Chapters 4 and 9. A base level vibration test was also conducted in accordance with the rulings specified by the Department of Transportation Performance Oriented Packaging Standards, 49 CFR Part 106 et al. Federal Register/Vol. 56, No. 245/Friday, December 20, 1991/Rules and Regulations. The objectives were to evaluate the adequacy of the container in protecting and retaining the rockets when secured with appropriate dunnage.

Three rockets are packed in polyethylene foam dunnage inside a fiberboard box, as shown in Figure 1. Two of the fiberboard boxes are then packed inside a wirebound wood box as shown in Figure 2.

TESTS PERFORMED

1. Drop Test

This test was performed in accordance with ST/SG/AC.10/1, Chapter 9, Paragraph 9.7.3. Five containers were used during the test series, one for each drop. The drop height was 1.2 meters and the drop sequence was as follows:

- a. Flat on Bottom
- b. Flat on Top
- c. Flat on Long Side
- d. Flat on Short Side
- e. On a Corner

The test was performed at ambient temperature ($70^{\circ} + 20^{\circ}\text{F}$). The contents of the container should be retained within its packaging and exhibit no damage liable to affect safety during transport.

2. Stacking Test

This test was performed in accordance with ST/SG/AC.10/1, Chapter 9, Paragraph 9.7.6. Three different containers were used, each with a stack weight of 1720 pounds. The test was performed for 24 hours. After the allowed time, the weight was removed and the container examined. Any leakage, deterioration, or distortion which could adversely affect transport or reduce its strength or cause instability in stacks of packages is cause for rejection.

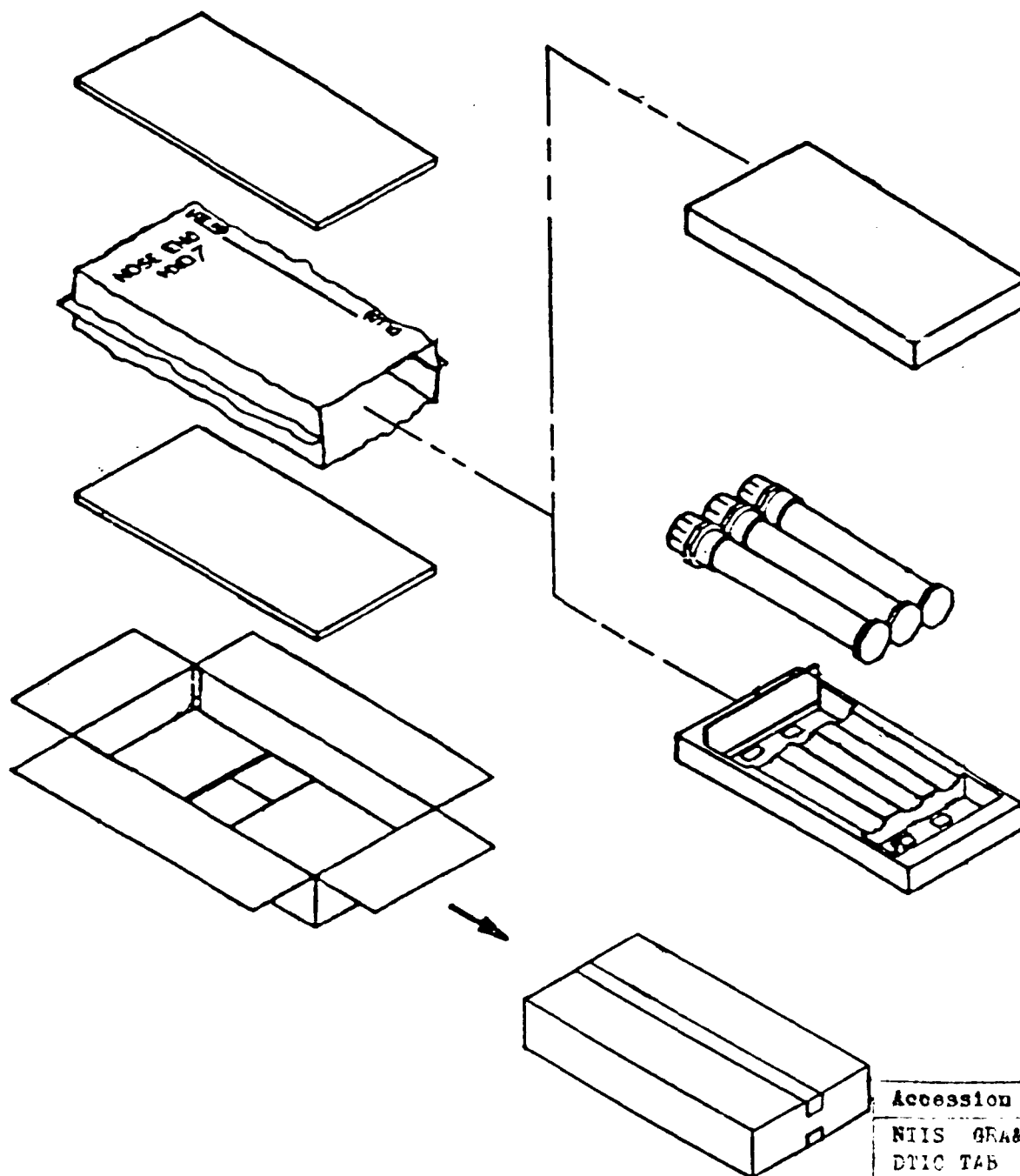


Figure 1.

Inner pack- three rockets in polyethylene foam dunnage in a fiberboard box.

| | |
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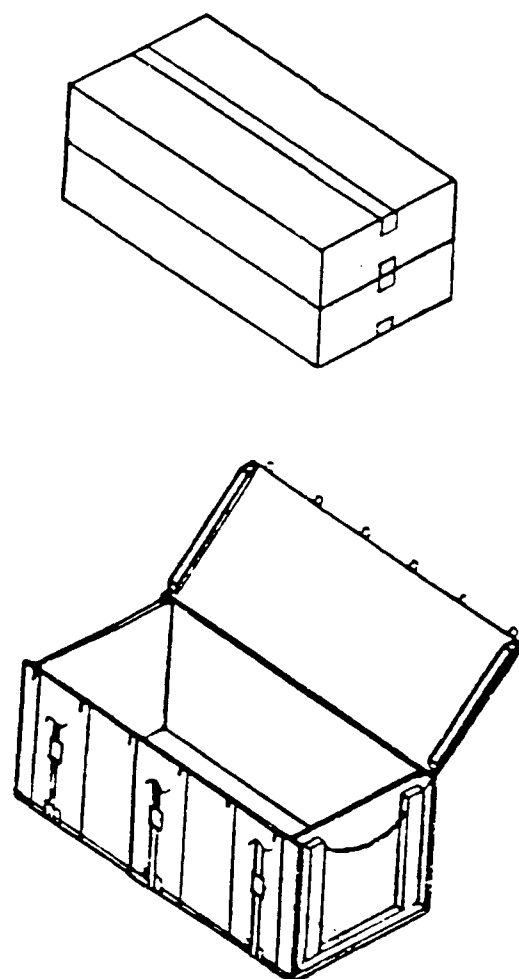


Figure 2.

Outer pack- two fiberboard inner
packs containing three rockets each
in a wirebound wood box.

3. Base Level Vibration Test

This test was performed in accordance with the Federal Register/Vol 56, No. 245/Friday, December 20, 1991/Rules and Regulations. Three sample containers were loaded with inert rockets and closed as for shipment. Each container was placed on a vibrating platform that had a vertical double-amplitude (peak-to-peak displacement) of one inch. The packages were constrained horizontally to prevent them from falling off the platform, but were free to move vertically, bounce and rotate. The test was performed for one hour at a frequency that caused each point of the container bottom to be raised from the platform to such a degree that a 1.6mm thick metal strip could be passed between the bottom of any package and the platform.

PASS/FAIL (UN CRITERIA)

The criteria for passing the drop test is outlined in Paragraph 9.7.3.5 of ST/SG/AC.10/1 and states the following: "Where a packaging for solid~ undergoes a drop test and its upper face strikes the target, the test sample passes the test if the entire contents are retained by an inner packaging or inner receptacle (e.g., a plastic bag), even if the closure is no longer sift-proof".

The criteria for passing the stacking test is outlined in Paragraph 9.7.6.3 of ST/SG/AC.10/1 and states the following: "No test sample should show any deterioration which could adversely affect transport safety or any distortion liable to reduce its strength or cause instability in stacks of packages".

PASS/FAIL (FEDERAL REGISTER CRITERIA)

The criteria for passing the Base Level Vibration Test is outlined in the Federal Register/Vol. 56, No. 245/Friday, December 20, 1991/Rules and Regulations and states the following: "Immediately following the period of vibration, each package shall be removed from the platform, turned on its side and observed for any evidence of leakage. A packaging passes the vibration test if there is no rupture or leakage from any of the packages. No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength."

TEST RESULTS

1. Drop Test

Satisfactory.

2. Stacking Test

Satisfactory.

3. Base Level Vibration Test

Satisfactory.

DISCUSSION

1. Drop Test

After each drop the container was inspected for any damage which would be cause for rejection. Final inspection revealed minor damage to the boxes, but no spillage of contents.

2. Stacking Test

Three containers were individually tested. Each container was visibly inspected after the 24-hour period was over. There was no leakage, distortion, or deterioration to the container as a result of this test.

3. Base Level Vibration Test

Immediately following the vibration test, each container was removed from the platform, turned on its side and observed for any evidence of leakage. All latches remained fastened and there was no evidence of leakage of contents.

REFERENCE MATERIAL

United Nation's "Recommendations on the Transport of Dangerous Goods", ST/SG/AC.10/1, Revision 6

Department of Transportation Performance Oriented Packaging Standards, 49 CFR Part 106 et al. Federal Register/Vol. 56, No. 245/Friday, December 20, 1991/Rules and Regulations

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DATA SHEET

CONTAINER:

Wirebound Wood Box for SMAW Encased Rockets

Type: 4C1**UN Code:**

Specification Number:
MIL-B-46506**Material:**
Wood

Gross Weight:
71.0 kg
(156.4 pounds)**Dimensions:**
1.00m L x .52m W x .41m H
(39.75" L x 20.50" W x 16.00" H)

Closure (Method/type):
Wire**Tare Weight:**
13.6 kg
(30.0 pounds)

Additional Description: Inner pack is fiberboard box with
foam cushions.

PRODUCTS:

See Table I

Proper Shipping Name: See Table II

United Nations Number: See Table I

United Nations Packing Group: II

Physical State: Solid

Amount Per Container: 6

Net Weight: Varies

TEST PRODUCT:

Name: Inert Rockets

Physical State: Solid

Size: N/A

Quantity: 6

Dunnage: Foam polyethylene

Gross Weight: 71.0 kg (156.4 lbs.)

TABLE I

| DODIC OR NALC | NSN | ITEM | TYPE | PACKING DRAWING | HAZ. CL. | UN NO. | GROSS WT. (KG) |
|---------------------|-----|------|------|--------------------|-------------|-----------|----------------------|
|---------------------|-----|------|------|--------------------|-------------|-----------|----------------------|

| | | | | | | | |
|------|------------------|--------|-------|--------------|------|------|----|
| HX04 | 1340-01-159-8082 | ROCKET | MK4-0 | 82A5027A0301 | 1.1C | 0280 | 62 |
| HX05 | 1340-01-158-0577 | ROCKET | MK3-0 | 82A5027A0201 | 1.1E | 0181 | 62 |
| HX06 | 1340-01-227-8870 | ROCKET | MK6-0 | 82A5027A0271 | 1.1E | 0181 | 65 |
| HX07 | 1340-01-227-8871 | ROCKET | MK7-0 | 82A5027A3400 | 1.1C | 0280 | 62 |

TABLE II

| UN SERIAL NUMBER | PROPER SHIPPING NAME |
|------------------------|----------------------------|
| 0181 | ROCKETS |
| 0280 | ROCKET MOTORS |